

Notice of Allowability

Application No.

10/615,094

Examiner

Timothy H. Meeks

Applicant(s)

ACKERMAN ET AL.

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 12/30/04.
2. ☒ The allowed claim(s) is/are 1-11 and 13-30.
3. ☒ The drawings filed on 08 July 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Donald Hasse on 2/15/05.

The application has been amended as follows:

Claim 1 has been amended as follows:

1. (Currently Amended.) A method for forming a controlled, relatively uniform aluminide coating on a turbine engine component having an external surface and an internal cavity defined by an internal surface that is connected to the external surface by at least one hole, the method being conducted in a vapor coating container having a hollow interior coating chamber, the method comprising the steps of:

- (a) loading the coating chamber with the component to be coated;
- (b) heating the loaded coating chamber to a temperature of from about 240°C to about 450°C;
- (c) flowing a tri-alkyl aluminum coating gas into the heated coating chamber at a pressure of from about 50 to about 2000 mtorr (about 0.68 to about 27 kgf/m²) for from about 0.25 to about 4 hours to deposit an aluminum coating on the external and internal surfaces of the component; and then

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(d) heating the coated component in a nonoxidizing atmosphere to a temperature of from about 500°C to about 1100°C to form an aluminide coating on the external and internal surfaces of the component,

wherein the aluminide coating on the internal surface of the blade is less than about 0.003 inches (less than about 76.2 microns) thick in the airfoil body portion and less than about 0.0015 inches (less than about 38.1 microns) thick in the root portion.

Claim 12 has been cancelled.

In claim 13, line 1, "12" has been changed to --1--.

Claim 17 has been amended as follows:

17. (Currently Amended.) A method for forming a controlled, relatively uniform aluminide coating on a turbine engine blade having an external surface and an internal cooling cavity defined by an internal surface that is connected to the external surface by cooling holes, the method being conducted in a vapor coating container having a hollow interior coating chamber, the method comprising the steps of:

(a) loading the coating chamber with the blade to be coated;

(b) heating the loaded coating chamber to a temperature of from about 240°C to about 450°C;

(c) flowing a tri-alkyl aluminum coating gas into the heated coating chamber at a pressure of from about 50 to about 2000 mtorr (about 0.68 to about 27 kgf/m²) for from about 0.25 to about 4 hours to deposit an aluminum coating on the external and internal surfaces of the blade;

(d) heating the coated blade in a nonoxidizing atmosphere to a temperature of from about 500°C to about 1100°C to form an aluminide coating on the external and internal surfaces of the blade; and then

(e) maintaining the blade at a temperature of from about 450°C to about 1100°C in the presence of oxygen to form an oxide coating on the external and internal surfaces of the blade;

wherein the aluminide coating [has a thickness of from about 0.0015 to about 0.003 inches (from about 38.1 to about 76.2 microns) on the external surface of the blade in the airfoil body portion, and has a thickness of from about 0.0005 to about 0.0015 inches (from about 12.7 to about 38.1 microns) on the internal surface of the blade] on the internal surface of the blade is less than about 0.003 inches (less than about 76.2 microns) thick in the airfoil body portion and less than about 0.0015 inches (less than about 38.1 microns) thick in the root portion.

Claim 28 has been amended as follows:

28. (Currently Amended) A method for forming a controlled, relatively uniform aluminide coating on a turbine engine blade having an external surface and an internal cooling cavity defined by an internal surface that is connected to the external

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surface by cooling holes, the method being conducted in a vapor coating container having a hollow interior coating the chamber. the method comprising the steps of:

(a) loading the coating chamber with the blade to be coated;

(b) heating the loaded coating chamber to a temperature of from about 250°C to about 300°C;

(c) flowing a tri-alkyl aluminum coating gas into the heated coating chamber at a pressure of from about 450 to about 550 mtorr (about 6.1 to about 7.5 kgf/m²) for from about 0.5 to about 2 hours to deposit an aluminum coating on the external and internal surfaces of the blade;

(d) heating the coated blade in a vacuum to a temperature of from about 640°C to about 700°C to form aluminide coating on the external and internal surfaces of the blade; and then

(e) maintaining the blade at a temperature of from about 600°C to about 800°C in the presence of oxygen to form an oxide coating on the external and internal surfaces of the blade

wherein the aluminide coating on the internal surface of the blade is less than about 0.003 inches (less than about 76.2 microns) thick in the airfoil body portion and less than about 0.0015 inches (less than about 38.1 microns) thick in the root portion.

The following is an examiner's statement of reasons for allowance: The prior art does not disclose or fairly suggest providing the different claimed ranges of thicknesses

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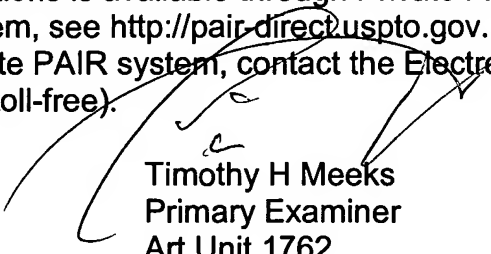
of the aluminide coating on the internal surfaces of the body versus the internal surfaces of the root portion of the blade. As set forth by applicants at paragraph 0026 of the specification, limiting the thickness of the coating in the root portion to the claimed range prevents material degradation and cracking in the root portion.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy H. Meeks whose telephone number is (571) 272-1423. The examiner can normally be reached on Mon 6-6 and Tues-Thurs 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Timothy H Meeks
Primary Examiner
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